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REMARKS

Claims 1-20 were rejected under 35 USC 103 as being unpatentable over Sexton et al, US Patent 5,818,887 in view of Vanghi et al, US Patent 6,597,923. Applicants respectfully traverse.

The Examiner asserts that Sexton et al disclose detecting and demodulating at least one signal of M-ary orthogonal symbols (MOK) comprising the steps of receiving the signals, demodulating the signals, and decoding the signals. The Examiner admits that Sexton et al do not teach the following steps that are included in claim 1:

1. calculating a metric;

2. calculating probabilities of different symbols for each symbol;

3. estimating a fading channel responsive to the calculating the probabilities;

4. iteratively feeding said metric, the decoded symbols, said probabilities, and said estimate back into said demodulating step to re-demodulate said symbols coherently. (Underlining in original).

Thus, the Examiner admits that more than of the claim's steps are not shown or suggested in Sexton et al. However, the Examiner asserts that Vanghi et al teach the missing steps, and in spite of the very significant difference between Sexton et al and claim 1, the Examiner asserts that it would have been obvious to one of ordinary skill in the art "to implement the teaching of Vanghi into Sexton as to determine a correct frame of digital information as taught be Vanghi."

Applicants respectfully traverse, believing that there is no motivation for implementing the teaching of Vanghi et al into Sexton et al, that a person skilled in the art would not implement the teachings of Vanghi et al into Sexton et al because their objective are significantly different, that if one were to implement the teachings of Vanghi et al into Sexton et al one would not achieve an arrangement that is better relative to determining "a correct frame." Additionally, Vanghi et al do not teach that which the Examiner asserts they teach..

Sexton et al describe an arrangement for accurately adjusting the timing during the recovery of a received signal that was transmitted by a remote transmitter. Basically, the Sexton et al received signals are applied to a demodulator at three instances: early, on time, and late. The demodulator outputs are used to estimate the transmitted symbols,

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and based on those estimates <u>a timing measure is selected and applied</u> to adjust a time for receiving the signal., (see labels 402, 200 and 404 in FIG. 4, which relate to controls applied to elements 66 and 70, and see also col. 1, lines 35-54). Thus, while it is true that signals are received and demodulated, the goal and the teachings of Sexton et al focus on having proper timing for the demodulating the received signal.

Vanghi et al teach a method and apparatus for transmitter power control. The focus of the teachings of Vanghi et al is to make sure that a transmitter employs only so much power as is necessary to achieve the desired quality of communication, and no more, because keeping the transmitter's power low permits a larger number of customers to be served, and also husbands battery power. *Therefore, Sexton et al and the Vanghi et al references are in significantly different areas of the art.*

Vanghi et al achieve their goal by decoding successive frames, and with the aid of results obtained in the course of the decoding Vanghi et al make a determination whether the remote transmitter's power ought to be increased or decreased. This information is communicated to the remote transmitter. More specifically, when decoding a frame, the decoder (106) iteratively processes the applied frame to discover the transmitted signals and, in the process, produces a "soft metric N" (col. 3, line 23). When, for example, the decoder fails to properly decode a frame within N_{MAX} iterations, a frame erasure is declared, the metric is set to $N_{MAX}+1$, and the output of an error rate threshold detector is set to 1. See col. 2, lines 25-28. This information is fed to elements 109, 110, and 111 and the result (ultimately) is a directive to the remote transmitted to increase the transmitted power.

It is respectfully submitted that there is no motivation whatsoever in Sexton et al (which focuses on demodulation <u>timing</u> within a receiver) to implement the teachings of Vanghi et al (which deals with developing a <u>signal to send back to a remote transmitter</u> in order to control the transmitter's power). It would not address any problem or deficiency that is found in the Sexton et al arrangement.

Further, it is respectfully submitted that a skilled artisan who is charged with the task of improving the Sexton et al arrangement (where, by the way, there is no recognized deficiency that aught to be overcome) would not look to control the

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transmitter's power and, therefore, it would not be obvious for a skilled artisan to implement the teachings of Vanghi et al in the Sexton et al arrangement.

Further still, there is no reason to believe the Sexton et al arrangement would in any way be improved by implementing the teachings of Vanghi et al in the Sexton et al arrangement. The Examiner's purposed motivation "as to determine a correct frame of digital information as taught by Vanghi" is not valid because, although one always wishes to "determine a correct frame of digital information," controlling the transmitter's power does nothing relative to <u>detection timing within a receiver</u>.

It is respectfully submitted that, viewed from all angles, a skilled artisan would not wish to implement the teachings of Vaghi et al in the Sexton et al arrangement and, therefore claim 1 is not obvious, even if Vanghi et al do teach all of the steps found in claim 1 that are missing in Sexton et al (which the following demonstrates to the contrary).

As indicated above, the Vanghi process is a one-pass process, in that each frame is decoded, a responsive signal is generated, and that signal is fed back to the transmitter. In the decoding of each frame, the decoder does go through an iterative process, but it is noted that no other signal is inputted to the decoder.

In contradistinction, claim 1 specifies receiving signals, demodulating the signals, decoding the symbols, developing a metric, calculating probabilities, estimating channel fading, and then feeding **all that developed information** back to the demodulating step. Thus, (1) the iterative step of claim 1 encompasses the step of demodulating, whereas Vanghi et al do not, and (2) the iterative process of claim 1 encompasses a number of signals, whereas Vanghi et al use only output of the demodulator.

Additionally, applicants respectfully disagree with the Examiner's assertion that element 220 of fig. 2 is functionally equivalent to the claimed calculating probabilities of different symbols for each symbol. Element 220 is responsive to two inputs: N, which is the aforementioned "soft metric," and N*, which is a threshold.

Applicants also note that the Examiner's assertion that the FER estimator corresponds to "estimating a fading channel responsive to calculating the probabilities" cannot stand because the Examiner asserts that the calculating the probabilities is carried out in element 220, but element 206 is NOT responsive to element 220.

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To conclude, applicants believe that the above demonstrates that Vaghi et al do NOT have steps that correspond to steps e, f, or g of claim 1.

It is respectfully submitted that even if only one of the claim 1 steps is missing in both Sexton et al and Vanghi et al, the result is that the combination of Sexton et al and Vaghi et al (even if there was any reason to combine them) does not anticipate claim 1.

Claims 2-12, 14-20 are believed patentable at least by virtue of their dependence on claim 1. Additionally, at least some of the claims contain limitations that are not described or suggested by the references.

For example, claims 3 and 14 specify a first instance of demodulating that is noncoherent, and each successive demodulating that is coherent. The Examiner asserts that Sexton et al teach demodulating a signal "coherently and noncoherently," citing col. 3, line 36. The cited line merely states that "receiver 60 may be coherent, non-coherent or quasi-coherent." Respectfully, that does not teach or suggest the claim 3 limitation.

Claims 4, 5, 16 and 17 specify the number of iterative steps that are taken. Other than the iterative steps taken within decoder 106, there are no iterative steps at all in Vanghi et al; and the number of iterative steps taken by decoder 106 is not taught to be a function of a step of testing the decoded signal for recognition improvement. Rather, the number of iterations appears to be determined by

> N*, a target number of iterations which the iterative decoder should take to determined a correct frame of digital information. (Col. 7, lines 20-21.)

As for claims 7 and 8, the Examiner asserts that Vanghi et al's abstract teaches log likelihood ratio. Applicants respectfully disagree. The words "log" or "likelihood" are not found in the abstract at all, and the only reference to a ratio is "signal to noise ratio" (SNR). Of course, log likelihood ratio is not synonymous with SNR. It is noted, moreover, that claim 8 specifies that the log likelihood ratio "is approximated by choosing a maximum term in a summation wherein said summation can be one of a summation of exponentials, modified Bessel functions and a product of both." Nothing like that is suggested in any of the references, and the Examiner has not even asserted that any of the references suggests it.

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As for claim 9, neither of the references actually teaches <u>symbol probabilities, or</u> <u>chip probabilities,</u> and there is nothing in the references to suggest that both must be, or ought to be calculated, or in what order.

Regarding claims 10, 11, 18, and 19, the Examiner points to element 64 of Sexton et al. Element 64 is a conventional element comprising a filter, down-converter, and phase demodulator that is interposed between the receiving antenna and all other circuits. Clearly, therefore, element 64 is strictly a function of the received signal. In contradistinction, claims 10 and 18 specify that a filter is used in estimating a fading channel from the results of the calculating of different symbols. In other words, the filter used in the claims 10 and 18 methods is clearly responsive <u>to a different signal</u> than the filter used in Sexton et al. As for claims 11 and 19, there is no teaching or suggestion in Sexton et al that the preprocessing filter within element 64 ought to be a Weiner filter.

As for claim 13, the Examiner asserts that Sexton et al teach a method for a receiver detecting and demodulating at least one signal of <u>complementary code keying</u> (CCK). In support of this assertion the Examiner points to element 60, and to col. 3, lines 15-65. Applicants respectfully traverse. Element 60 is the entirety of FIG. 4. That does not demonstrate the decoding of CCK signals. Also, there is no mention of CCK coding anywhere in the reference. The text passage cited by the Examiner it starts with

> As shown in FIG. 3, each frame 34 of digitally coded and interleaved bits includes ninety-six groups <u>of six coded bits,</u> for a total of 576 bits. Each group of six coded bits represents an index 35 to one of sixty-four symbols such as Walsh codes (Emphasis supplied)

but in contradistinction to the above, the accepted definition of CCK (found, for example, in http://www.webopedia.com/TERM/C/CCK.html) states that CCK is:

> a set of 64 <u>eight-bit code words</u> used to encode data for 5.5 and 11Mbps data rates in the 2.4GHz band of 802.11b wireless networking. (Emphasis supplied).

Clearly, therefore, the text passage quoted above, which was cited by the Examiner, proves that Sexton et al do not teach CCK signals.

The Examiner asserts that Sexton et al teach the step of "adding an extra known chip at a beginning of every symbol," but applicants respectfully disagree. The Examiner points to element 133, but element 144 is a summing element that is responsive to a signal applied by element 131 and accumulator 140. Neither of these signals is an "extra

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known chip" and neither of these signals is a symbol. As clearly taught by Sexton et al in col. 6, lines 51-59, the signals applied to element 131 are <u>timing measures</u> which are summed in circuit 133 with the contents of "timing measure accumulator 140."

The Examiner also asserts that Sexton et al teach the step of "calculating expected values of complex conjugates of every chip," but applicants respectfully disagree. The Examiner points to col. 4, lines 25-31, but the cited passage merely states that:

> It should be understood that in addition to having an index, each output signal 72 also has an associated complex number (not shown). Seven bits are preferably allocated to the real and imaginary portions, respectively, of the complex number, although fewer or more bits are possible. For simplicity, the index and the complex number will be referred to collectively as output signal 72.

All that is taught by the above-quoted passage is that each output signal is a complex number. That does not teach any operation that involves complex conjugation and, of course, it does not teach calculating expected values of complex conjugates of anything, particularly of every chip.

Thus, applicants respectfully submit that Sexton et al teach nothing more -- relative to claim 13 -- than mentioned above in connection with claim 1.

As for claim 15, the Examiner merely paraphrases the claim and asserts that "Sexton would include...." This assertion is not supported by any reference to text within Sexton et al, and applicants respectfully submits that the notions of (a) determining an argument of a maximum of a signal and a value of that maximum signal, (b)determining <u>first bits</u> of a code, and (c) <u>independently</u> and <u>differentially</u> demodulating the remaining bits, is considerably more involved than a notion that might be rejected with an unsupported assertion of "it is obvious." If the Examiner intends to maintain this rejection, applicants respectfully request that the Examiner support this rejection with a more substantive argument.

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In light of the above amendments and remarks, applicants respectfully submit that all of the Examiner's rejections have been overcome. Reconsideration and allowance of the outstanding claims are respectfully solicited.

Respectfully,
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